U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Lesquerella globosa* (Desvaux) Watson

COMMON NAME: Short's bladderpod

LEAD REGION: 4

INFORMATION CURRENT AS OF: March 2010

STATUS/ACTION

___ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status

___ New candidate

_X_ Continuing candidate

___ Non-petitioned

_X_ Petitioned - Date petition received: May 11, 2004

__ 90-day positive - FR date:

__ 12-month warranted but precluded - FR date:

__ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)?

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions?

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (*http://endangered.fws.gov/*) provides information on listing actions taken during the last 12 months.

Date when the species first became a Candidate (as currently defined): October 30, 2001

___ Candidate removal: Former LPN: ___

___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.

___ N – Taxon does not meet the Act's definition of "species."
___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering plants - Brassicaceae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Indiana, Kentucky, Tennessee

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Indiana, Kentucky, Tennessee

LAND OWNERSHIP: Most of the sites where *L. globosa* occurs are privately owned or are located within state and county road rights-of way. Exceptions to this include: two Tennessee sites occupy lands managed by the U.S. Army Corps of Engineers; one Tennessee site is situated on state-owned lands; and the lone Indiana site occupies land owned by the Indiana Department of Natural Resources. A review of land ownership for this species, based on recent natural heritage inventory data, is needed.

LEAD REGION CONTACT: Southeast Regional Office, Rob Tawes, 404-679-7142, *robert_tawes@fws.gov*

LEAD FIELD OFFICE CONTACT: Cookeville, Tennessee Field Office, Geoff Call, 931-528-6481, ext. 213, *geoff_call@fws.gov*

BIOLOGICAL INFORMATION:

Short's bladderpod is a perennial member of the mustard family (Brassicaceae) that occurs in Indiana, Kentucky, and Tennessee. This species was first described as *Vesicaria globosa* by Desvaux in 1814 (Payson 1922, pages 103-236). Because of several distinctive characters, Watson (1888) proposed that the American species of the genus *Vesicaria* be placed in the genus *Lesquerella* (Watson 1888, pages 249-252). This treatment was recognized as valid, and the currently recognized binomial for Short's bladderpod is *Lesquerella globosa* (Desvaux) Watson. The plants are 3 to 5 decimeters tall and have yellow flowers that appear March through May. The leaves are 1.5 to 3 centimeters (cm) long, 0.2 to 0.6 cm wide, gray-green in color, and densely hairy. The fruits develop soon after flowering and are round, small (0.2 to 0.27 cm in diameter), and become slightly hairy as they mature. These round fruits readily distinguish Short's bladderpod from other members of the genus *Lesquerella* and from other genera in the family such as *Brassica* and *Barbarea* (Shea 1993, page 6).

Lesquerella globosa grows on steep, rocky, wooded slopes and talus areas. It also occurs along cliff tops and bases and cliff ledges. The species usually is found adjacent to rivers or streams and on south- to west-facing slopes. Most populations are closely associated with calcareous outcrops (Shea 1993, page 16). The Indiana population is found within the Shawnee Hills Section of the Interior Low Plateaus Physiographic Province. The Kentucky populations are found within the Bluegrass Section of this Province. The Tennessee populations occur within the Highland Rim and Central Basin sections of the Interior Low Plateaus Province (Fenneman

1938, pages 411-448); Quarterman and Powell 1978, page 30).

Populations vary in size from 2 to about 1,500 individuals; most contain fewer than 50 plants. In a 1992 status survey for Short's bladderpod, Shea (1993, pages 6-15) reported that there were records of 50 sites that supported or historically supported this species. Of these 50 occurrences, only 26 were found to be extant during her survey. The remaining 24 records occupied sites from which the species had been extirpated, or insufficient information was available for the sites to be relocated during the survey. In 1993, Indiana supported one population of the species, Kentucky supported 14 populations, and Tennessee supported 11 populations.

In 1998, the Tennessee Department of Environment and Conservation (TDEC) conducted extensive searches for additional populations of Short's bladderpod and revisited most of the previously known sites. Shea (1999) reported that these searches revealed the presence of 7 new sites in Tennessee. Occurrences at these new sites varied in size from 3 to 60 plants. The Kentucky State Nature Preserves Commission (KSNPC) has, within the past few years, revisited all known Kentucky locations for Short's bladderpod. White (1999, pers. com.) reported that they had not discovered any additional populations of the species, but they had completed site conservation plans in 1998 for the highest quality Kentucky Short's bladderpod sites.

Homoya (1999, pers. com.) reported that despite searches for additional Indiana populations of Short's bladderpod, the species is restricted to only one site in Indiana. This population is owned by the Indiana Department of Natural Resources (IDNR) and grows on a clay bank adjacent to a periodically flooded gravel road. This flooding necessitates regular road grading in order to remove debris deposited during flood events. Homoya (2005, pers. com.) stated that the species had not been observed at the Indiana location that year and that habitat management needed to be implemented at the site. In late 2006, IDNR brush-cut and mowed this site, exposing small areas of mineral soil in an attempt to release a seed bank for Short's bladderpod and return the species to the area. . On May 18, 2007, seedlings were observed at the site. The site was flooded in early April 2008 by overflow from the Wabash River. The flooding deposited some woody debris, as well as breaking off the upper portions of the stems of many of the plants. Nonetheless, the plants sprouted axillary shoots and flowered, albeit at a later date (early to mid -May) than normal (mid- to late April). The population was estimated at over 100 flowering individuals, a definite increase in plants compared to the years just prior to management. In 2009, between 50-75 flowering plants were estimated as present at the site (Homoya 2009, pers. com.).

In 1998, there were a total of 18 known locations for Short's bladderpod in six Tennessee counties. Cheatham County had six sites. The two largest known populations occurred in Cheatham County; one of these large sites contained 1,000 plants, and the other contained 1,500 plants. The remaining 4 populations had 6, 6, 7, and 50 plants, respectively. Davidson County had four sites that supported the species, which varied in size from 13 to 50 plants. Jackson County had three locations supporting Short's bladderpod, which contained 3, 5, and 50 plants, respectively. Montgomery County had 2 populations, one of which contained 10 plants and the other had 21 plants. Smith County also had 2 populations, one of which had 10 plants and the other had 30 plants. Trousdale County only supported one population, which contained 100 to 150 plants in 1998. Estimates of the 1998 population levels for all of the known Tennessee sites were provided by Andrea Shea (1999, pers. com.). Lincicome (2004, 2005 and 2007) reported no

change in the species' status in Tennessee.

Tennessee Department of Environment and Conservation (TDEC) (2009, p. 1) monitored 17 extant Short's bladderpod occurrences during 2008, including a new one discovered in Dickson County, and found the following: there were three A-ranked occurrences with more than 1,000 plants, one AB-ranked with more than 1,000 plants in disturbed habitat, one B-ranked with 1,000 plants in poor habitat, five C-ranked with 300 or less plants, two CD-ranked with 50 or less plants, and five D-ranked with less than 30 plants. Extant occurrences occur along the Cumberland River in three different USCOE reservoirs in Cheatham, Davidson, Montgomery, Trousdale, Jackson and Smith Counties, and on the Harpeth River at the confluence with Cumberland River in the Cheatham Reservoir. TDEC surveyed most of these occurrences by boat with assistance from USCOE. The one new occurrence found on the Harpeth River in Dickson County was discovered by boat on the exposed limestone bluffs. These plants are on shaley ledges of the high bluff and probably cannot be accessed by foot. Seven clumps were seen from the boat but there could be more on the "non-exposed" portions of the bluff.

TDEC (2009, p. 1) reports that prior site visits or surveys for *L. globosa* were done in 1992-1993 and 1998. Since these surveys 10 to 16 years ago, the numbers of plants have increased at eight occurrences, remained stable at six occurrences, and decreased at two occurrences. One explanation for the increase in numbers could be that the counts or estimates of plants in 2008 were more thorough with more area of the sites explored. The plants are adapted to disturbed habitat and at the occurrences where the disturbance or open habitat remains unchanged; the numbers have increased or remained the same. One new site was found in 2008. Five occurrences could not be relocated; three have not been seen in 10 years and two have not been seen in 16 years, due mostly to overgrown or unsuitable habitat.

Shea (1993, pages 7-8) and White (1999, pers.com.) reported that Kentucky supported 14 Short's bladderpod sites. In 1992, these sites varied in size from 2 to 118 individual plants, and in 1998 they varied from 2 to 237 plants. One population in Bourbon County, Kentucky, had 118 plants in 1992 and 98 plants in 1998. Clark and Scott Counties each have one site, both of which supported only 2 plants in 1992. Franklin County contains 11 Short's bladderpod populations that vary in size from 4 plants to 237 plants. The majority of Franklin County sites (7 of 11) contain fewer than 50 plants. In 1998, the KSNPC developed site conservation plans for five of the Kentucky populations. These sites were chosen for conservation plan development because they were believed to be the highest quality sites remaining in Kentucky (White 1999, pers. com.). White's overall assessment of the species in Kentucky is that all sites are generally poor in quality (White, not dated). White (2005, pers. com.) stated that surveys conducted since 1999 resulted in the discovery of 2 new occurrences, but only 6 extant occurrences remain in Kentucky; 10 previously documented locations could not be relocated and were considered extirpated.

Historically, there were at least 57 sites supporting Short's bladderpod. Of these 57 sites, only 29 apparently are extant. All remaining populations are small and vulnerable to extirpation.

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

Road construction and road maintenance have played a significant role in the decline of *Lesquerella globosa*. During Shea's 1992 status survey for this species (Shea 1993, page 22), she observed at least three sites that had been lost or drastically reduced by road construction or maintenance activities. She also noted that road maintenance remains a threat at most of the sites. In the introduction to site conservation plans developed by KSNPC for the highest quality Kentucky sites, White (not dated) stated that, with only one exception, all of the sites are roadside occurrences that are no longer part of naturally functioning ecosystems. She also stated that most occur as small roadside remnants of natural cliffline or rock outcrops; consequently, her management recommendations for these sites concentrate on implementing roadside maintenance activities in a manner compatible with the protection of Short's bladderpod. In Tennessee, Element occurrences (EO) that could be affected due to road maintenance activities include: Trousdale Co. EO3, Davidson EO10 and EO4 (A-ranked occurrences), Cheatham Co. EO15, EO22, Smith Co. EO20. EO15 is located next to Montgomery Bridge on a bluff adjacent to the roadway (Tennessee Department of Environment and Conservation 2009, p. 3). Specific activities that have impacted the species in the past and continue to threaten it include bank stabilization, herbicide use, mowing during the growing season, grading of road shoulders, and road widening or repaving. Sediment deposition during road maintenance or from land disturbing activities adjacent to the sites supporting the species also potentially threatens many populations. These activities continue to affect many populations; though it is possible that road maintenance activities, if properly timed and implemented, could help to maintain conditions that enable Short's bladderpod to persist in these marginal habitats.

Tennessee Department of Environment and Conservation (2009, p. 4) provided information on another possible transportation related threat to Tennessee populations. Several sites in Cheatham County occur along the Cumberland River near a designated greenway located on the old railroad bed, as well as within the right-of-way of the inactive railroad corridor between Nashville and Clarksville. At the McMinns Bluff site, the *L. globosa* plants are located along River Road (Old State Route 12) that parallels this railroad (which is adjacent to the river). The railroad was abandoned many years ago but sections of it are still being maintained by the owner with herbicides and tree clearing equipment. There is currently a feasibility study being conducted of this railroad corridor for a possible commuter rail system. There are also *L. globosa* plants growing within the railroad corridor. This species thrives in disturbed areas and if the railroad is abandoned and there is no disturbance, there will be competition from other woody and herbaceous plants. On the other hand, if the railroad becomes active again there will be greater maintenance pressures which could threaten the existence of *L. globosa* at several sites. EOs that could be affected include: Montgomery Co. EO2, EO13 and EO28 (all failed to find in 2008); Cheatham and Davidson Counties EO17, EO30, EO1, EO10, EO4 and EO9 (not found in 2008). Three of these occurrences in Cheatham Co. are A- and B-ranked, probably the largest sites for the entire species.

Shea (1993, pages 22, 23) noted that impoundments and artificial water level manipulation threatened and, in a case along the Cumberland River, have destroyed sites supporting the species. Many Short's bladderpod locations are adjacent to rivers and streams, and impoundment and water level manipulation still threaten the species. In Tennessee, almost all of the

Lesquerella globosa locations are adjacent to the impounded Cumberland River and its tributaries thus water level manipulation is a possible threat. EOs that could be affected include: Montgomery Co. EO12, Trousdale Co. EO3, Smith Co. EO20, EO24, Jackson Co. EO25 (did not find in 2008), EO26, and EO27 (Tennessee Department of Environment and Conservation 2009, p. 3). However, we are not aware of any proposed changes in management of these aquatic systems that would threaten Short's bladderpod populations by manipulating water levels and inundating occupied habitats.

Invasive, nonnative vegetation is a threat at many sites. White (not dated) listed invasive plants as a major threat at all five of the sites for which she prepared management plans. This exotic vegetation was also noted as a threat by Shea (1993, page 24) in her assessment of the species' status. Invasive plants that have been identified as potential threats to Short's bladderpod include *Lonicera japonica* (Japanese honeysuckle), *Alliaria petiolata* (garlic mustard), *Trifolium hybridum* (alsike clover), *Melilotis alba* (sweet clover), *Festuca pratensis* (fescue), *Rosa multiflora* (multiflora rose) and *Camassia scilloides* (wild hyacinth). These plants have often been planted as ornamentals, as cultivated plants, or for erosion control; once established, they often become quite aggressive and displace native vegetation.

Activities such as commercial and residential construction potentially threaten the species at several sites. These threats can be direct in the form of actual loss due to construction, or indirect in the form of severe habitat alteration from sediment runoff from areas disturbed during construction. Other threats listed by Shea (1993, page 24), Homoya (2005, pers. com.), and White (not dated) include trash dumping, cattle and goat grazing, shading from overstory trees, and competition and shading from herbaceous perennials. We do not have current information regarding the imminence or magnitude of these threats to *L. globosa* populations.

Despite the threats listed above, typical for plants occurring in disturbed habitats such as roadsides, the viability of 10 of the 22 occurrences observed during 2008 in Tennessee were rated as fair or better. This indicates the magnitude of such threats is moderate. Efforts undertaken in 2006 to restore suitable habitat conditions at the Indiana site, located on land owned and managed by the Indiana Department of Natural Resources, apparently have shown early signs of success (Homoya 2007, 2008, 2009 pers. com.). While threats associated with roadside maintenance activities and invasive plant encroachment are imminent, these threats are of moderate magnitude.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

Although there is little or no commercial trade in Short's bladderpod at this time, inappropriate collecting for scientific purposes or as a novelty would be a threat to the species as most populations are very small and cannot support collection of plants for scientific or other purposes. However, we have no information to suggest that this threat is either imminent or of significant magnitude at this time.

C. Disease or predation.

Disease and predation are not known to be factors affecting the continued existence of the

species at this time.

D. The inadequacy of existing regulatory mechanisms.

The Tennessee Plant Protection and Conservation Act of 1985 (T.C.A. 11-26-201) forbids persons from knowingly uprooting, digging, taking, removing, damaging, destroying, possessing, or otherwise disturbing for any purpose, any endangered species from private or public lands without the written permission of the landowner. The species is listed as endangered in Indiana. Although this listing does not provide legal protection for the species, listed species are given special consideration when planning government funded projects. Additionally, the Indiana site is located on land owned by the IDNR where collection or damage to plants is prohibited. The species does not receive any State protection in Kentucky.

Because *L. globosa* receives no protection under state law in Kentucky, and the Indiana and Tennessee state laws protecting plants do not forbid destruction of plants on private lands with landowner consent, we conclude that inadequacy of existing regulatory mechanisms is a threat to the species.

E. Other natural or manmade factors affecting its continued existence.

None are known at this time.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED:

The KSNPC has developed site conservation plans for the five highest quality sites remaining in Kentucky. Cedars have been removed at one site, and Recovery Land Acquisition Funds (Section 6) were used to purchase another site. This property was dedicated by KSNPC as Rivercliffs SNP in 2006. Close investigation of the site revealed that plants on and adjacent to the property extended over a larger area than was previously known (White 2008, pers. com.). Seeds from one population have been deposited with the Center for Plant Conservation for long-term storage (White 2007, pers. com.). The TDEC has conducted extensive searches for additional populations of Short's bladderpod, but it has not taken any actions to protect known sites for the species. The Indiana site is on land owned and managed by the IDNR, which brush-cut and mowed the habitat in late 2006, exposing small areas of mineral soil in an attempt to release a seed bank for Short's bladderpod and return the species to the area. . The Indiana population responded favorably to this treatment as discussed above. Lincicome (2007, pers. com.) reported no monitoring for the species in Tennessee during 2006, but in FY2007 they received funds to review its status in the State. Bishop (2009) reported that all of the known Tennessee sites were visited during the 2008 status survey; the species is still extant at 21 previously known locations and an additional population of the species was discovered in Dickson County, Tennessee. Therefore, there are currently 22 extant occurrences in Tennessee.

The IDNR (Bacone1999, pers. com), the KSNPC (White 1999, pers. com) and TDEC (Shea 1999, pers. com) all supported the elevation of Short's bladderpod to candidate status and the eventual federal listing of the species as endangered or threatened. The Nashville District Corps of Engineers was aware of the elevation of Short's bladderpod to candidate status, and they

anticipated that they would be able to provide any management that is needed to protect the species on lands under their control. Region 3 of the Service supported the elevation of Short's bladderpod to federal candidate status.

SUMMARY OF THREATS:

Road construction and road maintenance activities have played a significant role in the decline of *Lesquerella globosa*. Specific activities that have impacted the species in the past and continue to threaten it in some locations include bank stabilization, herbicide use, mowing during the growing season, grading of road shoulders, and road widening or repaving. Sediment deposition during road maintenance or from other activities also potentially threatens the species. Interruption of natural processes that maintained habitat suitability and competition from invasive, nonnative vegetation necessitates active habitat management at many locations. We find that this species is warranted for listing throughout all its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

RECOMMENDED CONSERVATION MEASURES:

Conservation measures are being implemented to protect the species in all three states as outlined in earlier sections. All three states where the species is currently found supported the elevation of the Short's bladderpod to candidate status and the eventual federal listing as threatened or endangered. In an effort to abate threats posed by roadside maintenance activities, the Service and state conservation agencies should work with local highway departments and others responsible for roadside management to develop maintenance regimes that also maintain suitable conditions for Short's bladderpod. We also should engage the Tennessee Native Plant Society in this effort, as they have held workshops with Tennessee Department of Transportation to promote sustainable roadside management practices that are compatible with native plant conservation.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	**Imminent**	Monotypic genus	7
		Species	**8***
		Subspecies/population	9

	Non-imminent	Monotypic genus Species Subspecies/population	10 11 12

Rationale for listing priority number:

Magnitude: Road construction and road maintenance have played a significant role in the decline of *Lesquerella globosa*. Many of the sites supporting the species are roadside occurrences that are no longer part of naturally functioning ecosystems. Most occur as small roadside remnants of natural cliffline or rock outcrops. Specific activities that have impacted the species in the past and continue to threaten it in some locations include bank stabilization, herbicide use, mowing during the growing season, grading of road shoulders, and road widening or repaving. Many of the Short's bladderpod locations are adjacent to rivers and streams, and impoundment and water level manipulation would threaten the species. Invasive nonnative vegetation is a threat at many sites. Activities such as commercial and residential construction potentially threaten the species at several sites. These threats can be direct in the form of actual loss due to construction, or indirect in the form of severe habitat alteration from sediment runoff from areas disturbed during construction. Other threats to the species include trash dumping, cattle and goat grazing, shading from overstory trees and shading from herbaceous perennial plants.

Despite the threats listed above that are typical for plants occurring in disturbed habitats such as roadsides, the viability of 10 of the 22 occurrences observed during 2008 in Tennessee were rated as fair or better, suggesting that the magnitude of such threats is moderate. Efforts undertaken in 2006 to restore suitable habitat conditions at the Indiana site, located on land owned and managed by the IDNR, apparently have shown early signs of success (Homoya 2007, 2008, pers. com.). While threats associated with roadside maintenance activities and habitat alterations by invasive plant encroachment are imminent, these threats are of moderate magnitude. Threats associated with manipulation of water levels are low to moderate in magnitude due to the proportion of occurrences potentially affected.

Imminence: Threats associated with manipulation of water levels are not ongoing but the threats of habitat destruction or degradation due to incompatible roadside maintenance practices and invasive plant encroachment are ongoing, and therefore, imminent.

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No

The species is rare and threats are imminent. However, the threats have a slow and gradual effect on the populations, and are only moderate in magnitude. Therefore, an emergency listing is unnecessary.

DESCRIPTION OF MONITORING

The IDNR, KSNPC and TDEC monitor sites supporting the species when possible. Funds specifically designated for monitoring were provided to KSNPC in FY2004 and to TDEC in FY2007, which supported monitoring in Tennessee during 2008.

COORDINATION WITH STATES
Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: Indiana, Kentucky, and Tennessee

This species is not listed in any of the states' comprehensive Wildlife Action Plans (KDFWR 2005, TWRA 2005, Case and Associates 2005). Kentucky and Tennessee do not include plants in the plans.

Indicate which State(s) did not provide any information or comments: **N/A**

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: _____ June 15, 2010__
for Regional Director, Fish and Wildlife Service Date

Concur: _____ Date: October 22, 2010
ACTING
Director, Fish and Wildlife Service

Do Not Concur: _____ _____
Director, Fish and Wildlife Service Date

Date of annual review: March 28, 2010
Conducted by: Geoff Call, Fish and Wildlife Biologist, Cookeville, Tennessee Field Office